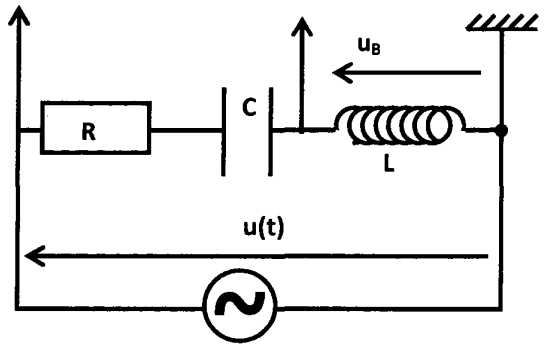
Exercice N° 6 :

1°)



2°) On a $-\frac{\pi}{2} < \varphi_u - \varphi_i < \frac{\pi}{2}$

Or $u_B = L\frac{di}{dt} \Rightarrow \varphi_{u_B} = \varphi_i + \frac{\pi}{2}$

Donc $-\frac{\pi}{2} < \varphi_u - (\varphi_{u_B} - \frac{\pi}{2}) < \frac{\pi}{2}$

$-\pi < \varphi_u - \varphi_{u_B} < 0$

u_B est toujours en avance % à $u(t)$

Donc la courbe **(1)** est $u_B(t)$ et la courbe **(2)** est $u(t)$

3°)

a- $N = \frac{1}{T} = \frac{1}{10.10^{-3}} = 100$ Hz

b- $U_m = 6$ V

$U_{Bm} = 10$ V

4°)

• $U_{Bm} = L\,\omega\, I_m \Rightarrow I_m = \frac{U_{Bm}}{L\omega} = \frac{10}{5.10 - 2.(200\pi.} = 0{,}318$A

$I_m = 0{,}318$ A

• $Z = \frac{U_m}{I_m} = 18{,}85\Omega$

• $\Delta t = \frac{T}{6}$

• $|\Delta\varphi| = \omega\Delta t = \frac{2\pi}{T} \cdot \frac{T}{6} = \frac{\pi}{3}$

$\varphi_{u_B} - \varphi_u = \frac{\pi}{3}$ Donc $\varphi_u - \varphi_{u_B} = -\frac{\pi}{3}$

5°)

a- $\varphi_i = \varphi_{u_B} - \frac{\pi}{2}$

$\Rightarrow \varphi_i - \varphi_{u_B} = -\frac{\pi}{2}$

$\Rightarrow \varphi_u - \varphi_{uB} = \varphi_u - (\varphi_i + \frac{\pi}{2}) = \varphi_u - \varphi_i - \frac{\pi}{2}$

Donc $\varphi_u - \varphi_i = (\varphi_u - \varphi_{u_B}) + \frac{\pi}{2} = -\frac{\pi}{3} + \frac{\pi}{2} = \frac{\pi}{6}$

b- $\varphi_u - \varphi_i > 0$ u(t) en avance par rapport à i(t) donc le circuit est inductif.

c- $\cos(\varphi_u - \varphi_i) = \frac{R}{Z} \Rightarrow R = Z\cos(\varphi_u - \varphi_i)$

$\Rightarrow R = 18{,}85 \cos(\frac{\pi}{6})$

$R \simeq 16\ \Omega$